OBSERVATIONS

ON THE

NATURE AND PROPERTIES

OF

FIXIBLE AIR,

AND ON THE

SALUTARY EFFECTS

OF THE

AQUA SALUBRIS,

In preserving HEALTH, and preventing DISEASES.

To which are added,

STRICTURES on the PRESENT PRACTICE of PHYSIC, Pointing out the CAUSES which greatly obstruct the IMPROVEMENT of the HEALING ART.

Submitted to the attentive Consideration of the PUBLIC.

By JOHN MELVILL, M. D.
JOHN-STREET, ADELPHI.

Homines in nulla re Deos proprius accedunt quam salutem hominibus dando. CICERO.

O fons blanduſiæ ſplendidior vitro dulci digne mero. HOR.

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ERRATUM.

Under the article, page 72, *Stone*, instead of *and one third part of it may be administered with common water*, read, *and one third part common water, may be administered.*

INTRODUCTION.

THE following Obſervations on Fixible Air, and the Artificial Mineral Water, which I think proper to diſtinguiſh by the name of *Aqua Salubris* *, or *Salubrious Water*, have for their object the preſervation of health, and the prevention of diſeaſes, which is allowed to be the firſt duty of a phyſician; the art of curing being only the ſecond.

"When we conſider phyſic, ſays an eloquent modern author †, as the art of ſometimes prolonging life, and enabling mankind to paſs the

* This water has been hitherto called Aqua Mephitica, which literally ſignifies ſtinking water. The word Memphitica, by a figure in grammar, called Syncope, is read frequently Mephitica, and is derived from Memphis, the ancient name of the preſent city of Grand Cairo, in all ages remarkable for the offenſive water with which it is ſurrounded. The word is uſed poetically—Sæva Memphitis, Virg.—Sulphuriæ Memphites, Perſ.—How ſuch an ungracious appellation came to be given to the elegant artificial mineral waters, is not eaſily to be conceived. I believe I ſhall be juſtified in ſubſtituting Aqua Salubris in its place.

† Baron Beilfield.

days of their exiſtence in the moſt perfect ſtate of health of which their natures are capable; it is, in theſe reſpects, a ſcience which merits all the attention and the higheſt regard of mankind: it is a ſcience which cannot be ſufficiently explored."

I am aware that the beſt performances of this kind have met with the greateſt obſtruction, from the prejudices which prevail among the people in general, and too frequently among ſuch, whoſe condition of life, and education, ought to have placed them above the reach of this common infirmity. But this diſcouragement has not been ſufficient to deter me from my preſent undertaking; there is reaſon to believe, that the great progreſs of the arts, the high cultivation of literature, and the conſequent refinement of manners and taſte, in moſt civilized nations, and particularly in this country, have, in a good degree, weakened the force of theſe prejudices, and opened a door to the favourable reception of what is now offered for the public good.

Apprehending the ſubject to be of a very intereſting nature, and wiſhing it to be clearly underſtood by perſons of every denomination,

into

into whoſe hands this publication may chance to fall, I have ſtudied plainneſs and perſpicuity, rather than decoration of ſtile, and have avoided, as much as poſſible, technical terms and phraſes, and, where they were neceſſary, care has been taken to explain them.

In treating of the nature and properties of Fixible Air, I ſhall ſtate with brevity a doctrine, the foundation of which was laid by the celebrated Dr. Hales, who maintains *, that there is a principle in matter, known by the name of Fixible Air, which forming the cement, or bond of union, among the conſtituent particles of bodies, is to be held as the cauſe of firmneſs and coheſion in thoſe bodies, into whoſe compoſition it enters; and is to be regarded as the ſole preventive of their diſſolution and decay. This doctrine has been gradually improved, and ſtrongly ſupported by a great variety of well conducted experiments of ſome of the moſt diſtinguiſhed philoſophers and phyſicians of this and other countries. As Fixible Air is aſcertained to be

* That the great Sir Iſaac Newton was of the ſame opinion of Doctor Hales, appears from a paſſage of his third Book of Optics. See the note in Maquer's Dictionary, under the article Putrefaction.

the cauſe of firmneſs and the principle of health in the human body, and the great reſiſter of putrefaction, to which it is conſtantly liable, and as this preſerving element is attainable in the greateſt perfection, the diſcovery made by Dr. Hales may be juſtly conſidered as the moſt important, reſpecting the health of mankind, of any yet made; and, it is but reaſonable to expect, that the greateſt benefits may, in proceſs of time, be derived from a judicious direction of it by art.

Fixible Air has hitherto, by phyſicians, been confined to the *cure* of diſeaſes, and has been generally adminiſtered, in a ſtate of ebullition or efferveencſce, and in many caſes with ſurpriſing ſucceſs. The Aqua Salubris, or Artificial Mineral Water, in which the Fixible Air is in a ſtate of reſt, has likewiſe been exhibited as a *medicine* only. It is my intention to conſider it at preſent in another point of view.

After a ſeries of accurate experiments for upwards of ſix years, I am the firſt perſon, at leaſt as far as I know, who, independent of its medical virtues, has diſcovered it to be alſo, when properly combined, in the manner hereafter mentioned, the moſt ſalutary neceſ-

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ſary of life, and, at the ſame time, one of the moſt elegant luxuries, tending to preſerve health, and to prevent diſeaſe, in a greater degree, than any thing yet come to our knowledge: and, what renders it ſtill more valuable is, that every perſon, from the man of fortune, to the intelligent induſtrious artizan, may prepare it for himſelf, may uſe it in the manner hereafter preſcribed, and then pronounce on the good effects of it from his own conviction.

Having committed myſelf thus far, in commendation of the Aqua Salubris, I think it neceſſary, in the ſubſequent pages, to inform my readers from what motives I was induced to inveſtigate the properties, and by what ſteps I was led gradually to diſcover the virtues of this ſalutary water.

In ſubmitting the following obſervations to the public, I do not allow myſelf to be deceived by the vain expectation, that this ſmall tract will find its way into the houſe of every common perſon, like a piece of furniture. It is more than probable, that by far the greateſt number of that deſcription will never ſo much as hear of its exiſtence; and of thoſe who may chance to give it a reading, ſome may fail to compre-

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hend it, notwithſtanding its ſimplicity. The intelligent and diſcerning, therefore, of every rank, who are capable of laying aſide prejudice, are the perſons to whom I really addreſs myſelf. From their reading and underſtanding the ſubject, from their giving the Aqua Salubris an impartial trial for their own ſakes, and from their candour and humanity in communicating their experience to others, this valuable acquiſition will, ſooner or later, become generally known and uſeful.

Convinced that the uſe of the Aqua Salubris is very intereſting to the human race in general, I truſt it will not be found unworthy the conſideration of the Royal Societies of theſe kingdoms, and the Societies inſtituted for ſimilar purpoſes in other countries, all of them diſtinguiſhed by their zeal in encouraging the advancement of true learning and uſeful knowledge, and in patronizing every honourable attempt to promote the general good of mankind. I truſt, likewiſe, that thoſe poſſeſſed of the advantages of a liberal education, the ſtudious in every branch of literature, and the proficients in the fine arts, will find it deſerving their attention, as not only promoting health, and inducing temperance,

perance, but as moſt friendly to genius and the exerciſe of the intellectual powers.

On this occaſion, I perſuade myſelf that my endeavours to bring the Aqua Salubris into uſe, will meet with the hearty concurrence and approbation of the Faculty, at leaſt of the moſt conſcientious and diſintereſted; many of whom, I am aſſured, poſſeſs that elevated benignity of mind, which prefers the pleaſure ariſing from the *prevention* of diſeaſes, to a brilliant diſplay of abilities in *curing* them.

I think it unneceſſary to trouble my readers with any apology for the manner in which this ſmall performance is executed. I hope the utility and importance of the ſubject will atone for any imperfections that may be met with. I wiſh my profeſſional avocations had allowed me time to have made it more perfect; and I ſhall think myſelf happy, if what I have now offered to the public ſhall excite men of ſuperior abilities to reconſider this wonderful principle of nature, Fixible Air, to throw new lights upon it, and to forward the benevolent undertaking, which I, from the beſt intentions, have ventured to begin.

OBSERVATIONS

ON THE

NATURE AND PROPERTIES

OF

FIXIBLE AIR.

THE moſt intereſting diſcoveries, whether philoſophical or medical, have been generally received with doubt, and have gained credit by ſlow degrees. It requires a ſeries of years before they are ſo completely embraced, as to be productive of the great advantages which might naturally be expected from them. In this manner the laws of motion diſcovered by Galileo, the circulation of the blood by Harvey, and the inſenſible perſpiration by Sanctorius, were received, believed, and embraced.

With reſpect to the ineſtimable diſcovery which Dr. Hales had the honour to make, it was received with doubt, is now in a good

degree

degree believed, and, I hope, the time is fast approaching, when it will be universally adopted.

About the beginning of the 17th century, Van Helmont, the most celebrated physician of his age, had the credit of being the first who observed Fixible Air in the waters of Spaw in Germany, and distinguished it by the name of *Gas Silvestre*; but his notions about it are so fanciful and erroneous, that it would be needless to quote them.

About fifty years after, Rivirius, an eminent French physician, was the first who prescribed Fixible Air, obtained from lemon juice and the salt of wormwood, in the nausea and vomitings in malignant fevers, to the great relief and refreshment of the patients. It does not, however, appear, that he attributed the happy effects to the Fixible Air, or that he was at all acquainted with the subject.

That great improver of natural knowledge, the Hon. Robert Boyle, knew that Fixible Air might be produced, by fermentation, corrosion, and dissolution of bodies, and other chymical experiments: but this philosopher seems not to have known the principal use of this air, which is so intimately mixed with,

and

and wrought into, the compoſition of all animal, vegetable, and mineral bodies. To the indefatigable induſtry, therefore, of the excellent Dr. Hales, the world is indebted for the great diſcovery, that Fixible Air is the elementary principle which forms the cement or bond of union among the conſtituent particles of bodies. It is about eighty years ſince that great philoſopher publiſhed his curious and intereſting experiments, and thereby opened a new field in natural philoſophy; yet the enquiry has not been proſecuted ſo far as from their importance might have been expected. Except the learned phyſicians, Haller and M'Bride, and a modern diſtinguiſhed chymiſt, the tranſlator of Maquer's Dictionary, there are no writers that I know of, who have paid that attention to the diſcoveries of Dr. Hales which they certainly merit.

When, however, the reſult of the experiments of a number of the moſt celebrated philoſophers and phyſicians, Boyle, Haller, Black, Pringle, M'Bride, Brownrigg, Prieſtley, Bewley, Dobſon, and others, is duly conſidered, it amounts to a demonſtration of Hales's doctrine to every unprejudiced enquirer.

By

By the experiments of Boyl and M'Bride, the antiſceptic quality of Fixible Air, or its power of reſiſting putrefaction, has been clearly illuſtrated. Without its being extricated from a body no putrefaction can happen, and, even by the abſorption of it, putrid ſubſtances may again be rendered ſweet.

Mr. Bewley has aſcertained it to be an acid, and that it does not in the leaſt participate of the vegetable or mineral acids employed to procure it.

The experiments of Sir John Pringle and Dr. M'Bride (many of which I have repeated with great ſatisfaction) are ſufficient to convince any unbiaſſed reader, that Fixible Air is liberated from our aliment in the act of digeſtion, which is proved to be a fermentive proceſs *. It is this proceſs which brings about that new diſpoſition and different combination in the parts of the alimentary ſubſtances, which enables the immenſe variety of diſcordant mixtures that enter into the compoſition of our food, to depart ſo far from their original na-

* Fermentation is, by chymiſts, defined to be an inteſtine motion excited ſpontaneouſly, with the aſſiſtance of proper heat and fluidity, betwixt the integrant and conſtituent parts of certain compound bodies, from which reſult new combinations of the principles of thoſe bodies.

tures,

tures, as to become one mild, ſweet, nutritious fluid.

In order to form a more complete idea of the uſe of Fixible Air in the human body, it will be neceſſary to conſider the nature of putrefaction, another great agent in the operations of nature, equally ſurpriſing and neceſſary with the former *. Putrefaction is "the great proceſs appointed by the Supreme, for the reſolution of animal and vegetable ſubſtances into the elements from which they were originally formed. By this proceſs, the oak and the bramble, the cedar and the hyſſop, fruits whether delicious and nutritive, acrid or poiſonous, the moſt beautiful of the human ſpecies, or the moſt deformed of the other tribes of animals, are all reduced to one common lot; nor are the elements, to which they return, to be diſtinguiſhed from each other. This reſolution, when philoſophically conſidered, is equally wonderful with their formation, and is alike governed by regular

* Putrefaction is, by chymiſts, defined to be an inteſtine motion or fermentation, excited in the proximate principles of animal and vegetable ſubſtances, by which a decompoſition and total change of the nature of thoſe principles are produced. MAQUER.

gular and invariable laws. Every ſeed produces its own plant, and every animal its own ſpecies; they live, they are nouriſhed, and each retains its individual nature; they die, they decay, and return to their elementary ſtate, and are again employed, as the conſtituent parts of other animals, and vegetables. Such, with reſpect to the material part of the creation, is the amazing circle of life and death, in which nature keeps her ſteady rounds, and moves by laws, fixed by the Almighty *."

It appears then, at this day, from the moſt accurate and convincing experiments, that Fixible Air is a primary element, a permanently elaſtic, uninflammable, acid *fluid*, or *vapour*, very much reſembling common air, but ſpecifically heavier, and viſible, ordained to be the cauſe of the coheſion and firmneſs of the fibres, and the ſuſtaining, animating, and invigorating principle of health and ſtrength of the human body, and from its great antiſceptic power, oppoſed to, and ordained to reſiſt, the proceſs of putrefaction, which is to reſolve it into its original elements as ſoon as it

* Dobſon.

ſhall

ſhall have anſwered the purpoſes of its formation. It pervades and keeps in ſweetneſs the air in which we breathe, and all our aliment, whether ſolid or fluid; without it the moſt delicious wines become vapid, and animal and vegetable ſubſtances unfit for uſe. It is capable of being greatly condenſed by cold, which conſiderably encreaſes its virtue. With this deſcription of the nature and properties of Fixible Air I wiſh to impreſs the minds of my readers, eſpecially thoſe who either have not time or inclination, or who may not, perhaps, be altogether qualified to ſtudy philoſophical ſubjects. As to thoſe who wiſh to be more particularly informed of the experiments upon which the foregoing definition is founded, I ſhall refer them to the works of the authors already quoted, in the peruſal of which they will find equal pleaſure and conviction. A recital of thoſe experiments would have ſwelled this publication beyond the limits preſcribed, and would have been read and underſtood only by *the few*, who are pleaſed with ſuch ſubjects.

Of the Uſe of the AQUA SALUBRIS, *or* ARTIFICIAL MINERAL WATER, *in preſerving Health and preventing Diſeaſes.*

Before I enter upon this part of my ſubject, I think it incumbent on me to inform my readers, from what motives I was induced to inveſtigate the properties, and by what ſteps I was led gradually to diſcover the virtues of this ſalutary water. In the year 1773, I was attacked with a ſevere rheumatiſm, which continued about four months. During moſt of the time I was confined to my room, unable to walk, but with the greateſt pain, and my left arm was ſo much contracted and debilitated, as to be almoſt uſeleſs. Soon after, I embarked for the Weſt-Indies, where the warmth of the climate, and ſuitable remedies, relieved my pains, and my arm became almoſt ſtraight. In the Summer of 1777, I returned to England. In the month of November I was again afflicted with my former complaint, and the contraction of my arm encreaſed. Reſolved, if poſſible, to ſubdue ſo painful a diſeaſe, I had recourſe to the moſt effectual medicines, from which I received conſiderable benefit, as I had formerly done; but my

arm

arm was never quite free from pain, and the contraction ſtill remained.

In the fall of the year 1779, I was brought almoſt to the point of death, by a complaint in my lungs, accompanied with a ſpitting of blood, and other dangerous ſymptoms, which, in the following ſummer, yielded to a ſtrict regimen and proper remedies, but left me ſubject, at times, to a ſpaſmodic aſthma. In the two following years, I had frequent returns of the rheumatiſm, particularly in the fall of the year 1782, with greater ſeverity than uſual, accompanied with gravel and bloody urine. The very unpleaſant proſpect, which now preſented itſelf, of paſſing the remainder of my days in pain, urged me to conſider my complaint with particular attention. Obſerving my remedies had only afforded me a temporary relief for a courſe of years, I began to ſuſpect I had placed too great confidence in medicine. Among other remedies I had been in the habit of uſing, *were the ſolutions of the ſalt of wormwood, and ſalt of tartar, charged with Fixible Air*, which were continued for ſome time with advantage, after ſeverer remedies had done their office. I obſerved, that in a week or two, after they were

 diſ-

diſcontinued, my pains invariably returned with more or leſs violence. I was at the ſame time convinced, that the *Fixible Air* was the efficient ingredients in theſe ſolutions, as, without it, they had no good effect whatever. From an early period of my life, *I had been perſuaded of the truth of the doctrine eſtabliſhed by the celebrated Dr. Hales; and had ever been of opinion, that it had not been ſufficiently attended to.* Hence, on this occaſion, I was led to re-conſider the experiments upon which it was founded, with thoſe of *Haller*, *Pringle*, *Black*, *M'Bride*, &c. many of which I repeated, to my entire ſatisfaction, and, under the moſt perfect conviction, concluded, *that the rheumatiſm, gout, gravel, ſtone, ſcurvy, and many other chronic complaints, ſo called from their long continuance, as alſo many other acute diſeaſes, were occaſioned by the deficiency of the Fixible Air in the ſyſtem, which being extremely volatile, eaſily makes its eſcape, and thereby leaves the ſaline, oily, inflammable, earthy, and watery particles to act upon each other, in proportion to their attractive and repulſive powers, and thereby form new combinations productive of theſe complaints.*

Hitherto,

Hitherto, as I have already obſerved, I had received temporary relief from the ſolution of the ſalt of wormwood, charged with *Fixible Air*, after the uſe of ſeverer medicines; but being unable, as well as unwilling, to live entirely on medicine, I conceived a drink might be contrived for common uſe, charged with *Fixible Air*, agreeable to the taſte, and at the ſame time capable of preventing the accumulation of that morbid matter which was the cauſe of my complaint. From theſe obſervations I was led to conſider the properties of the *Aqua Salubris*, which conſiſts of pure water impregnated with elementary air, and from which I began to cheriſh hopes of relief. I well knew that *pure water* had been the object of admiration in every age, on account of its various and ſalutary properties, ſo neceſſary to the exiſtence of animal and vegetable life; I knew it to be the moſt univerſal ſolvent, and that it was the cauſe of fluidity in the animal juices, without which there could be no circulation, perſpiration, digeſtion, or ſecretion. I was convinced, as has been already obſerved, *that elementary Fixible Air was the preſerving, invigorating principle of health and ſtrength in every liv-*

ing creature. From theſe poſitions I was led to draw this fair and obvious concluſion, *that a judicious combination of theſe two perfect elements, with a due proportion of wine or ſpirit, to correct its coldneſs on the ſtomach, would conſtitute the moſt congenial and ſalutary neceſſary of life, calculated to preſerve the human body in health, and when weakened with ſickneſs, to reſtore it to vigour;* perfectly perſuaded of the truth of this deduction, my former courſe of medicines were again without loſs of time reſumed. In the ſpace of about three weeks, my pains were greatly abated, my arm became almoſt ſtraight, and my gravel entirely diſappeared. In the month of January, 1783, I commenced the uſe of the *Aqua Salubris* combined with wine, or ſpirits, in the proportions hereafter mentioned, as my common drink, and with a degree of ſucceſs which anſwered my warmeſt expectations. In the courſe of three months uſe of the *Aqua Salubris*, as a neceſſary of life, which I found more agreeable to the taſte than any other kind of liquor whatſoever, my pains were entirely removed, and my arm became quite ſtraight, and as ſtrong as ever. From that period to the preſent day, I have

not

not had the ſmalleſt ſymptom of the rheumatiſm, gravel, or bloody urine, excepting when I accidentally am ſeized with a ſevere cold, or chuſe to diſcontinue the *Aqua Salubris*, which I have occaſionally done for ſome time, in order to aſcertain its efficacy with preciſion. Theſe ſlight returns never fail to yield to a few doſes of *the impregnated ſolution already mentioned*, in the courſe of a few days: I at the ſame time proceed with the *Aqua Salubris* as my common drink, which has always the ſame invariable effect in preventing the return of my rheumatiſm and gravel; and the ſpaſmodic aſthma, to which I was liable, has for theſe ſix months entirely left me.

The art of impregnating water and other liquor with *Fixible Air*, is one of the moſt important inventions, antient or modern, *for which the world is much indebted to the ingenuity of Dr. Prieſtley, and alſo to Dr. Nooth, for his elegant glaſs apparatus, which is an improvement on the method propoſed by Dr. Prieſtley.* By this happy invention, we are put in poſſeſſion of the *Aqua Salubris*, or *Artificial Mineral Water, which may juſtly be eſteemed one of the greateſt bleſſings which*

mankind have, in any age, derived from the beſt directed efforts of human genius. Dr. Prieſtley has very truly remarked, that thoſe who have made the moſt important diſcoveries, ſometimes overlook their moſt obvious uſes; and he might have added, with equal truth, that they ſeldom arrive at an adequate knowledge of the extent of their value. This laſt remark is particularly applicable to the diſcovery made by *Dr. Hales, and Dr. Prieſtley's invention.* Little did the former know, when he diſcovered *the principle of Coheſion*, that at the ſame time he had diſcovered *the principle of health in the human body*; and the latter thought himſelf happy, that by means of his invention, *he had found a ſubſtitute for the foreign medicinal mineral waters, which he obſerves are imported at a great expence.* It has been my lot to diſcover, *that the Aqua Salubris, independent of its uſe in medicine, from the perfection of its component parts, neceſſarily conſtitutes the baſis of the moſt ſalutary congenial drink in nature*, which I hope the concluſive reaſons I have already adduced, confirmed by accurate experiments and facts, during the ſpace of ſix years, has

has aſcertained to the ſatisfaction of every candid and intelligent enquirer.

Of the Preparation of the AQUA SALUBRIS.

The beſt method yet known to prepare the *Aqua Salubris*, or *Artificial Mineral Water, is by means of Dr. Nooth's glaſs apparatus.* Theſe glaſſes are made very accurately, and ſold by *Mr. Blades, manufacturer to his Majeſty, Ludgate-hill; and by Mr. Parker, manufacturer to the Prince, Fleet-ſtreet; both of whom, with Dr. Magellan, have made ſome ingenious improvements on the apparatus.*

PROCESS.

Fill the middle glaſs, repreſented in the plate, with ſpring, or any other pure, wholeſome, or diſtilled water, and join to it again the upper glaſs with its ſtopper; pour water into the bottom veſſel, ſo as to cover the riſing in the bottom; about three quarters of a pint, or a little more, will be ſufficient. Fill an ounce phial with oil of vitriol, adding it to the water, in the bottom veſſel, and ſhaking it till they are well mixed. As

heat is generated by this mixture, it will be prudent to pour in the vitriol * by a little at a time, otherwiſe the bottom glaſs will be in danger of being broken. Put to the water and vitriol, ſo mixed, through a wide glaſs or paper funnel, about an ounce of the powder of raw marble or chalk. The funnel muſt be uſed to prevent it from touching the inſide of the lower veſſel; for, if that happened, it would ſtick ſo cloſe to the neck of the middle glaſs, as not to admit of their being ſeparated without breaking. Immediately after place the middle and upper glaſſes joined together, in the mouth of the bottom veſſel, which is ground air tight to receive it, and put the ſtopper into the upper glaſs; then all the Fixible Air, which is diſengaged from the vitriolic acid and marble powder, will paſs through air-holes into the neck of the middle glaſs, and force a quantity of water equal to its bulk into the upper veſſel ſo as to fill it. When this is obſerved, the middle and upper glaſſes may be taken off together, and ſo ſhaken, that the water and air within them may be much agitated, by which means a

* Any vegetable acid may be uſed, but the vitriolic is found the beſt, as being the ſtrongeſt.

con-

conſiderable part of the *Fixible Air* will be abſorbed into the water: after they have been ſhaken a few minutes, looſen the upper from the middle veſſel, ſo that the remaining water may deſcend into the middle glaſs, and that the unabſorbed air may make its eſcape. The upper and middle glaſſes being again put together, are to be replaced upon the bottom veſſel, in order to continue the proceſs as before; and after the ſame operation has been repeated ſix or ſeven times, the water will be, in general, ſufficiently impregnated. When the efferveſcence ceaſes in the lower glaſs, it may be renewed by ſhaking it, ſo that the powder of marble at the bottom may be mixed with the oil of vitriol above it, and then a greater quantity of air will be diſengaged. But when the efferveſcence cannot be renewed, by ſhaking the whole apparatus together, either more vitriol, or marble powder muſt be put in, or more water, if neither of them produce the deſired effects; remembering that not more than one third, or half at moſt, of the quantity of vitriol or marble powder uſed at firſt, is to be added, at any one time, when it is neceſſary to renew the efferveſcence. If the apparatus is changed

three

three times in the courſe of ſixteen or twenty hours, the water will be ſufficiently impregnated without agitation *. The marble powder is

* I prefer this method, as there is much leſs danger in burſting the glaſſes. Here I ſhall preſent my readers with Dr. Prieſtley's method, which, though not ſo convenient and cleanly as the glaſs apparatus, nevertheleſs may be very uſeful to thoſe who cannot procure glaſſes, or who find them too expenſive.

PREPARATION.

Take a glaſs veſſel, *a*, plate 2, fig. 1, with a pretty narrow neck, but ſo formed, that it will ſtand upright with its mouth downwards, and having filled it with water, lay a ſlip of clean paper or thin paſteboard upon it; then, if they be preſſed cloſe together, the veſſel may be turned upſide down, without danger of admitting common air into it; and when it is thus inverted, it muſt be placed in another veſſel, in the form of a bowl or baſon, *b*, with a little water in it, ſo much as to permit the ſlip of paper or paſteboard to be withdrawn, and the end of the pipe, *c*, to be introduced. This pipe muſt be flexible, and air tight, for which purpoſe it is, I believe, beſt made of leather, ſowed with a waxed thread, in the manner uſed by ſhoemakers; into both ends of this pipe a piece of quill ſhould be thruſt, to keep them open, while one of them is introduced into a veſſel of water; and the other in the bladder, *d*, to the oppoſite end of which is tied round a cork, which muſt be perforated, the hole kept open by a quill, and the cork muſt fit a phial, *e*, two thirds of which ſhould be filled with chalk juſt covered with water. I have ſince, however, found

is preferable to the chalk, as it yields more *Fixible Air*, and more gradually, conſequently with

found it moſt convenient to uſe a glaſs tube; and to preſerve the advantage which I had, of agitating the veſſel, *f*, I have two bladders communicating by a perforated cork, to which they are both tied, for one bladder would hardly give room enough for that purpoſe.

PROCESS.

Things being thus prepared, and the phial containing the chalk and water being detached from the water, pour a little oil of vitriol upon the chalk and water; and having carefully preſſed all the common air out of the bladder, put the cork into the bottle preſently after the effervescence is begun. Alſo preſs the bladder once more, after a little of the newly generated air has got into it, in order the more effectually to clear it of all the remains of the common air, and then introduce the end of the pipe into the mouth of the veſſel of water, as in the drawing, and begin to agitate the chalk and water briſkly; this will preſently produce a conſiderable quantity of Fixible Air, which will diſtend the bladder, and this being preſſed, the air will force its way through the pipe, and aſcend into the veſſel of water, the water at the ſame time deſcending and coming into the baſon.

When about one half of the water is forced out, let the operator lay his hand upon the uppermoſt part of the veſſel, and ſhake as briſkly as he can, not to throw the water out of the veſſel, and in a few minutes the water will abſorb the air, and taking its place, will nearly fill the veſſel as at the firſt. Then ſhake the phial containing the chalk and water again, and force more air into the veſſel, till, upon the whole,

with leſs danger to the glaſſes. At the ſecond ſetting, half of the contents in the bottom veſſel may be decanted, and freſh materials added, of water, vitriol, and marble duſt, until ſufficiently impregnated; but at every third ſetting, the bottom veſſel ſhould be made perfectly clean, and the whole apparatus ſhould be waſhed clean every week. As ſoon as the water is ſufficiently impregnated, it ſhould be put into bottles, well corked, and ſealed with wax, and the bottles ſhould be placed on their ſides, in the coldeſt corner of the cellar. If it is uſed from the apparatus, the ullage ſoon grows vapid. The *Fixible Air* being very volatile, aſcends to the empty ſpace, and flies off at the top, or with the water when it is drawn off: and this is a certain proof of its being genuine; *for when there is any vegetable or mineral acid mixed with it, an acidulous taſte remains for many days in the ullage, as hap-*

whole, about an equal bulk of air has been thrown into it; alſo ſhake the water as before, till no more of the air can be imbibed. As ſoon as this is perceived to be the caſe, the water is ready for uſe; and if it be not uſed immediately, ſhould be put into a bottle as ſoon as poſſible, well corked and cemented."

Extracted from Dr. Prieſtley's Experiments on Air.

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pens to ſome of the foreign mineral waters imported into this country.

Of the various Combinations of the AQUA SALUBRIS *with Wine, and other Liquors, and Method of uſing it as a Neceſſary of Life.*

That the *Aqua Salubris* may be productive of the good effects which have been ſo happily experienced, it muſt be combined *with wine, cordials,* or *ſpirits.* The following proportions will, I apprehend, be found the beſt: *when uſed with French, German, Italian, or home-made wines, from one third part to one half wine muſt be added to the Aqua Salubris; with thoſe of Spain and Portugal,* from one ſixth to one third part at moſt; with cordials and ſpirits, from one eighth to one fourteenth part, according to their ſtrength. Although theſe proportions will be generally found the beſt, yet they may ſometimes be increaſed and diminiſhed, according to circumſtances.

The *Aqua Salubris,* uſed in the manner I have recommended, unites more perfectly than wine or other fermented liquors, *three great requiſites to human happineſs, health, temperance,*

perance, and chearfulneſs: it is preferable to fermented liquors, as they are rarely equally fermented. Moreover, in theſe liquors, the *Fixible Air* is frequently in a ſtate of effervescence, which is too apt to occaſion diſagreeable, and ſometimes painful flatulencies, as is experienced in drinking Champaign, bottled beer and cyder. *The Aqua Salubris is prepared without fermentation* *, *and in it the Fixible Air is in a ſtate of reſt:* its virtues are greatly increaſed by cold; and as a proof of its perfection, *it bears concentration by froſt.* When taken cold into the ſtomach, combined as already directed, it pervades the whole ſyſtem, quickens the circulation, and ſtrengthens the habit, before it has time to grow flatulent,

* The hiſſing which is obſerved when the marble powder is mixed with the vitriol and water, is a different phenomenon in nature from fermentation, as chymiſts well know. All acids whatever have a natural affinity with calcareous or chalky ſubſtances. The Fixible Air being an aërial acid, or vapour, is abſorbed by the marble in the earth, or from circumambient air, and the effervescence which takes place when the marble powder is thrown into the vitriol and water, is owing to the impetuoſity with which the ſtronger vitriolic acid diſpoſſeſſes the aërial acid, which is lighter, and forces it to take its ſtation, in proportion to its ſpecific gravity.

which

which it certainly would do, if taken in an expanded ſtate.

It is obſervable, that nations in a ſtate of barbarity are delighted with ardent ſpirits, and drink to intoxication and madneſs: but as civilization advances, milder liquors are preferred, ſobriety becomes neceſſary, and at length faſhionable.

The reformation that has taken place of late years does honour to this country: there is certainly, upon the whole, much leſs hard drinking than formerly; and yet, I believe, I may be allowed to ſay, that in this particular there is ſtill room for ſome amendment. Our taſte is ſufficiently refined, to have preferred the elegant light wines of France, and other parts of the Continent, to thoſe of Spain and Portugal, which are ſtrong and auſtere. From commercial motives, and the high price of the beſt wines conſequent thereon, the preference has been given to the latter, which has ſerved to keep alive the remains of a Gothic reliſh for ſtrong liquors.

But it is fortunate for this country, that theſe ſtrong wines may now be uſed to the greateſt advantage, and made to ſupply the place of the moſt expenſive wines. The *Aqua Salubris*

Salubris mixed in the manner I have mentioned, *with good red port, Nice, Madeira, cherry, or Seges wine,* will be found a moſt agreeable ſubſtitute for *Burgundy, claret, and hock; equally elegant, they communicate a benevolent exhilarating warmth to the heart, are more invigorating and conducive to health, leſs heating and intoxicating, than any foreign wines whatever drank alone. With mountain, ſweet Liſbon, and home-made orange and cowſlip wines, as alſo with cordials and ſpirits, it furniſhes a great variety of pleaſing drinks very exhilarating and ſalutary. With ſugar, honey, capillaire, ſyrups, and powder of ginger, and even by itſelf, it forms an agreeable healthy beverage, eſpecially when drank in the morning or forenoon.* The ſingular benefit I had received from the *Aqua Salubris,* combined in the foregoing manner, made it my duty to adviſe and recommend it to my friends, patients, and acquaintance of every deſcription; and during the laſt ſeven years, the uſe of it has been attended with the ſame invariable ſucceſs, except in a very few inſtances, which ſhall be mentioned hereafter.

It is very remarkable, that the moſt intereſting diſcoveries have been made, and their utility

utility gradually unfolded, according as the circumſtances of mankind, in different ages of the world, ſeemed to require, and as they became fit to receive and apply them. Of the truth of this obſervation ſome memorable inſtances might be given. When the time was approaching, that the terraqueous globe was to be circumnavigated, new regions explored, and the great family of mankind were to be introduced to each other, it was *then, the mariners compaſs was invented; the principles of aſtronomy were adapted to the purpoſes of navigation*, and inſtruments for the ſurveying the ocean were contrived, by which means an intercourſe was opened *with the new world, equally aſtoniſhing to the enterpriſing Europeans, as to the wondering Antipodes whom they viſited.* When the period drew near, that the arts and ſciences were to be revived, and the human mind emancipated from the ſhackles of ignorance and ſuperſtition, *it was then the Art of printing was invented*, by means of which the world is now illuminated to ſuch a degree, *as that Gothic ignorance can never again prevail.* It is now about eighty years ſince *the doctrine of Hales, taken from a hint of the immortal Newton*, was publiſhed

to the world, *in the dawn of experimental philoſophy*. Before that time, I believe mankind was not ſufficiently mature to receive and apply it. From that time to the preſent, the truth and merits of his doctrine have been gradually diſcloſed; and, I am perſuaded, the time is drawing near, when, after a more perfect knowledge *of the fermentive and putrefactive proceſs, it will become the baſis of a more rational, perfect, and intelligible theory than any the world has yet been favoured with*, and lay the foundation *for ſimplifying the practice of phyſic at a time when it appears to all conſiderate, ſenſible, humane men, ſo greatly requiſite*.

Reaſoning, *à priori*, or from the firſt appearance of things, it might be concluded, *as being perfectly conſiſtent with the order of nature*, the ſimplicity of its operations, and the *benignity of its author*, that the preſerving, animating element, *Fixible Air* ſhould, under various modifications and combinations with medicine, judiciouſly applied, *conſtitute the moſt general remedy*. It might alſo be concluded, if there were a general remedy, that it would be *eaſily attainable*, and of ſuch a nature, as to be under ſome combination or other,

other, *generally agreeable to the taſte of the creatures whom it was calculated to preſerve in health, and to reſtore when ſick.* The truth of the above concluſion is juſtified by a number of facts, with which every intelligent perſon, without being either a philoſopher or a phyſician, may eaſily be made acquainted, to his perfect conviction.

1ſt. For upwards of thirty years, ſince the excellent eſſays of *Dr. M'Bride* were firſt publiſhed, *the utility of Fixible Air*, in the cure of diſeaſes, has been manifeſted by all rational practiſers, at home and abroad, eſpecially in all kinds of fevers whatever.

2d. The efficacy of mineral waters in the cure of chronic diſeaſes, has been for many years univerſally acknowledged, and, at the ſame time, the virtue of theſe waters is allowed by all who have ſtudied the ſubject to conſiſt in their being ſtrongly impregnated with *Fixible Air*. *Dr. Elliot*, in his valuable publication, treating of the waters *of Spa*, enumerates almoſt *all the chronic diſeaſes* incident to the human body, *and among* the *reſt barrenneſs*, which are cured by theſe waters.

3d. The great utility *of the Aqua Salubris, as a neceſſary of life,* in preſerving health, *and preventing the return of chronic complaints, or greatly mitigating their violence, ſo as to render them very tolerable.*

4th. The ſingular ſucceſs *of the alkaline impregnated ſolution,* already mentioned, in caſes of the ſtone, as appears *from a valuable publication by Dr. Falconer of Bath,* editor of an excellent commentary on *Fixible Air,* a *work of the late much lamented Dr. Dobſon.* From this medicine the ſame ſucceſs has been experienced *in rheumatiſm, ſcurvy, gravel, and other chronic complaints,* and ſometimes *the gout,* by many under my direction for a number of years paſt.

5th. It is now certain, that the uniform cauſe of the health and longevity of the inhabitants of the more northern climates, ariſes from the condenſation *of the Fixible Air,* by which means the air they breathe in, is ſtrongly impregnated with it, and thereby the ſtrength of the fibres and vital powers * are greatly increaſed.

* His late Majeſty of Pruſſia had ſome reaſon to ſubſcribe to the truth of this remark, after having, as he thought, beat the Ruſſians for three days ſucceſſively, he found a retreat

creaſed. Hence the ſharpneſs of froſt, and the agreeable glow it occaſions when not too ſevere. Hence the difficulty of breathing, to ſuch as are troubled with the ſpaſmodic aſthma; and hence the practice of preſerving animal ſubſtances perfectly ſweet without ſalt, in Norway and America. There is, indeed, a degree of froſt which is dangerous to animal life; but even on that occaſion, *Fixible Air is ſtill the remedy*; for ſnow, in which Fixible Air is ſtrongly condenſed, is externally applied, and uſed internally to prevent the fatal effects of froſt on the living ſubject, *and with invariable ſucceſs when ſeaſonably adminiſtered.*

6th. The conſtant ſtrong deſire which thoſe confined to beds of ſickneſs, particularly in fevers, and many other diſeaſes, *expreſs for fruits and liquids abounding with Fixible Air*, for which they pant, and no wonder, as it is the deficiency of the preſerving principle in the ſyſtem, that is the cauſe of their complaint.

treat became abſolutely neceſſary, and, in the opinion of his beſt friends, with the loſs of a victory, which obliged that great man to confeſs, that he had indeed ſeen more brilliant troops, but never any ſo little diſpoſed to go away.

7th. *Fixible Air* is eaſily procured in every civilized nation, and at a ſmall expence, either as a neceſſary of life, or as a medicine.

8th. and laſtly, It is ſo univerſally agreeable to every taſte, that among many hundreds, I believe I might have ſaid thouſands in my lifetime, I never met with one of any age, ſex, complexion, or deſcription, who was not delighted with one or other of *the combinations already mentioned*; and truly it is impoſſible it ſhould be otherwiſe, as the human frame could not ſubſiſt without it.

For theſe reaſons, which I apprehend will appear ſatisfactory to every candid and intelligent reader, without being either *a philoſopher or a phyſician*, and for reaſons already given in the foregoing pages, it may be fairly concluded, *that elementary Fixible Air is not* only the cauſe of *firmneſs and health in the human body*, but alſo under various modifications and combinations, intended by *the author of nature*, to be the moſt *univerſal remedy*. *But this general remedy comes far ſhort of what has been long vainly and abſurdly hunted for by idle dreamers in phyſic, an univerſal panacea or medicine, that would cure every malady of itſelf alone.* For inſtance, *Fixible Air*, with

all

all its virtues, cannot be adminiſtered in any way or form, that will remove an inveterate deep-ſeated chronic rheumatiſm, where the percoſteum, the ſenſible membrane which covers the bones, is greatly affected; in ſuch a caſe, more efficacious medicines, *ſuch as camphor, mercury, antimony, and opium,* muſt be adminiſtered with judgment, according to the circumſtances of the patient, and perſiſted in for a reaſonable time, until the obſtructions are removed, and the ſymptoms are abated; *then, and not till then, will the elementary Fixible Air* in the *alkaline impregnated ſolution* and the *Aqua Salubris have the deſired effect*; and the ſame may be ſaid of other *inveterate chronic diſeaſes*; and alſo of ſome of the *acute kind,* of which I have had no inconſiderable ſhare of experience in myſelf and others.

STRICTURES *on the* PRESENT STATE *of the* PRACTICE *of* PHYSIC.

Among the many modern improvements, it muſt be confeſſed, that thoſe in anatomy, ſurgery, and chymiſtry, are very conſiderable; and it affords me ſincere pleaſure to obſerve,

that the practiſers in this country have had no ſmall ſhare of reputation in the improvement.

But although the practice of phyſic has been ſomewhat reformed, yet it certainly has not kept pace with the other arts and ſciences in this reſpect, to the great mortification of every man of honour in the profeſſion. The ſlow motion of phyſic, in its courſe towards reformation, is not owing to the want of learning or uſeful knowledge; for truly, there is much more of both to be found among the phyſicians of the preſent, than of any preceding age: they certainly know as much as their predeceſſors did, and a great deal more; but their ſuperior knowledge, by one means or other, has not in general been exerted to the beſt advantage in the improvement of the healing art. Many reaſons have contributed to retard the reformation of phyſic, and, I believe, the following are not the leaſt:

1ſt. The practice has undoubtedly been much embarraſſed with a variety of ingenious, fanciful, and contradictory theories, and frequently participating of them all, is but too often found to be *frivolous, whimſical, experimental and bold*; and although it were admitted

that

that all theſe theories had merit, yet it would require a greater ſhare of judgment, and diſcernment, than falls to the lot of every practiſer, to diſtinguiſh what is proper to be adopted, from that which ought to be rejected.

2d. It is to be regretted, that the apothecaries have, from long uſage, been obliged to ſubmit to the degrading mortification of being paid for their medicines, like labourers for their brick and mortar, inſtead of being remunerated for the exerciſe of *their ſkill and judgment in the line of their profeſſion*, with an *annual allowance, or a reaſonable fee.* This humiliating treatment of a reſpectable body of men has gradually introduced *a very dangerous ſpecies of commerce, highly prejudicial to the ſucceſsful practice of phyſic: it creates a ſuſpicion, which, it is to be feared, is not always without foundation, that the phyſician, who is generally named by the apothecary, may be tempted to conſider the intereſt of his employer in his preſcriptions, by directing ſome additional draughts, which are not quite neceſſary, eſpecially as the apothecary has no other way of being paid, than by the quantity of his medicines*; but this ſpecies of ſeeming *pious fraud*, how-

ever

ever cautiouſly conducted, is frequently attended with the moſt dangerous conſequences, eſpecially *to delicate patients*, who, by a repetition of nauſeous draughts, grow weary of their remedies, and ſicken at the ſight of numberleſs phials. This treatment diſpoſes them *to relinquiſh the means of cure, and ſubmit to their fate, rather than paſs through the apothecary's ordeal, or continue a fruitleſs courſe of medicine, which otherwiſe conducted, might have afforded them relief; while patients, with firmer habits, take every doſe that is preſented to them with no better ſucceſs.* I have ſeen ſuch unhappy effects from this practice, that where I have had ſufficient influence, I have always recommended it to the patient, or his friend, to *give the apothecary an occaſional fee, eſpecially where there was appearance of danger; inaſmuch as the medicines I preſcribed were not adequate to the apothecary's trouble.*

Nothing is better known to the beſt informed part of the faculty, than that a few well-choſen, well-directed medicines only are neceſſary to the cure of diſeaſes in general. There cannot be a ſtronger proof of the truth of this aſſertion, *than the uniform conduct of the faculty themſelves when they are ſick*; I

appeal

appeal to their feelings, their candour, and their humanity, whether they would ſwallow the ſame quantity of unpleaſant doſes were they themſelves ſick, which are with ſo much facility preſcribed to their patients: they indeed take but very little, and ſome of them none at all. He is, however, equally miſtaken who deſpiſes medicine, as he who takes too much. The man is indeed unfortunate, and profitted but little by his obſervations in the world, let his profeſſion be what it may, who has not diſtinguiſhed between the rational uſe of medicine, and the abuſe of it. The lot of human nature expoſes us to a great variety of diſeaſes through the different ſtages of life, from the weakneſs of infancy, the changes that take place in our approach to puberty, from the changes of weather, from our ſtudies and our employments, our exerciſes and pleaſures in our riper years; even the table is too often a ſnare: but wiſe and indulgent Nature has furniſhed remedies for theſe evils. The man, who has experienced an ardent fever, an excruciating rheumatiſm, or an agonizing cholic, under the care of an able and humane practiſer, will not heſitate to celebrate the praiſes of a well-directed medicine.

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The due application of medicine, however, is only the exercise of scientific common sense; and when it ceases to be such, it becomes commercial trick and artifice, or the effusion of superabundant dulness and ignorance. For my part, when I am indisposed, I readily see the necessity of a seasonable remedy; but then I take it effectually, and in the least possible quantity that will produce the effect. As it is the duty of every man to do as he would be done by in every situation, *there surely can be no case where such a duty is more obligatory, than when it respects the health and lives of our fellow-creatures.*

But the faculty are not altogether to be blamed, they are rather to be pitied; the error originates from the mode in which the patient chuses to satisfy his apothecary. *I appeal to the good sense of this enlightened country, whether it is not highly improper, inexpedient, and even unsafe, to make it the interest of the apothecary to administer more medicine than is absolutely necessary; would it not be more wise to make them an annual allowance, or give them a regular fee for their attendance and medicine?* By this judicious treatment, the physician would be under no temptation to glance at the interest

reſt of the apothecary in his preſcriptions. By this treatment the ſtock of the apothecary would conſiſt *of ſkill and judgment*, inſtead of *a huge farrago of uſeleſs medicines*. His genius would be exerted in contriving the moſt direct means of extinguiſhing a diſorder, if poſſible, in the firſt inſtance, inſtead of ſtudying the art of dividing and ſubdividing the lengthy preſcription of *ſome celebrated myſterious phyſician, who, in the language of medical commerce, is ſaid to write well.*

3d. *The myſtery* in which phyſic has hitherto been involved, is not a little detrimental to the practice; it leads to a ſuſpicion of a ſort of myſterious confederacy betwixt the phyſician and the apothecary, often painful to the mind of the ſuffering, ſuſpecting patient, and almoſt inclines him to conſider them rather as his undertakers than his friends. It is hardly conceivable, in this refined age, that phyſicians ſhould ſtill continue to write their preſcriptions in a foreign language, which, if known to the apothecary, is not always clearly underſtood by his apprentice, who is to prepare, and not at all to the mother or nurſe, who is to adminiſter the medicine. The characters, likewiſe, which are to determine the quantity

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of each ingredient, are written in myſtical figures, perfectly unintelligible to people in general, except the faculty themſelves. The uſe of this myſterious parade, at firſt, was to convey an idea *of profound learning, and to conceal the ſecrets of the art*: Such an artifice might be pardoned during the darkneſs, ignorance, and pedantry of the 15th century, but is truly abſurd and ridiculous at this day. I ſhould be glad to be informed, what imputation there could be brought againſt the learning or judgment of a phyſician, were he to write in the language of the country his recipe, with which he intended to cure his patient, and which, in order to have effect, ought to be perfectly underſtood by the apprentice who is to make up, and thoſe who are to adminiſter the medicine?

Or if ancient inveterate cuſtom has made it neceſſary, in order to avoid the ſuſpicion of ignorance, for the preſcriber to write in Latin, *would it not be wiſe, as well as humane, to tranſlate his recipe?*

By ſo doing, the phyſician who, with all his learning, and even the beſt intentions, is not infallible, would be certain he had committed no miſtake, and this precaution would be the

means

means of preventing miſtakes in others. I have ſeen ſuch unfortunate conſequences from preſcriptions not being underſtood, that, for the future, I ſhall think it my duty to hazard the cenſure of the moſt preciſe part of the faculty, and give a tranſlation of my preſcriptions. Notwithſtanding health and life are held to be more dear and valuable than property, yet it is aſtoniſhing, with how much more attention, the latter is regarded and ſecured than the former. In the purchaſe of an eſtate, there is always a deed, and a counterpart for the buyer and ſeller; but no ſecurity is required or expected from the phyſician, even while he has the patient's life and money in his hand at the ſame time. There can be no good reaſon given, why the phyſician ſhould not be obliged by law to give a tranſlated counterpart of his preſcription, for which he has received a valuable conſideration; it would at leaſt be ſome degree of ſecurity for the ſafety of the patient.

4th. Prejudice and faſhion is alſo greatly detrimental to good practice. It is not uncommon to meet with a popular phyſician, otherwiſe a man of reſpectability in his profeſſion, who has taken up an inveterate preju-

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dice (for inſtance) againſt blood letting, ſo far as hardly to preſcribe that remedy on any account, except in ſome very obvious caſe, ſuch as an apothecary's apprentice ought to be diſmiſſed for miſtaking. But it is ſtill more common to find another phyſician, perhaps of equal eminence and popularity, directing the uſe of the lancet, almoſt in every caſe, even when an apothecary's apprentice would at leaſt heſitate; now theſe two kinds of phyſicians are equally to be blamed, and are equally hurtful to ſociety in their practice. It cannot be denied, that inflammatory diſeaſes are leſs frequent now, than in the days of *Sydnahm*, the modern *Hippocrates*. The great uſe of tea, coffee, ſugar, and other mollifying luxuries, has gradually introduced a ſoft fibre, inſtead of the rigid fibre of the laſt century, and therefore diſeaſes tend more to putridity than inflammation; nevertheleſs, bleeding ever was, and ever will be an uſeful and neceſſary remedy. But unhappily for ſociety, ſhould two ſuch phyſicians take a lead among the faculty, then are the errors of both ſanctified into faſhion among their followers, who either are not capable of diſcovering their miſtakes, or want reſolution to correct them. I remember, when in the Weſt

Indies,

Indies, an influenza, which extending over many latitudes, occaſioned a general catarrhal complaint, accompanied with a difficulty of breathing and a pain in the ſide; notwithſtanding bleeding in that country is in general pernicious, yet, on that occaſion, I did not heſitate to direct it, which was attended with the moſt happy ſucceſs, while thoſe who neglected it, loſt many of their moſt valuable negroes. The truth is, the application of powerful remedies depends ſo much upon the occurrence of various circumſtances, as entirely to preclude faſhion from good practice.

For the above reaſons, and others ariſing from the ſame unhappy ſource, the incertitude of cure is greatly encreaſed, and the practice in danger of falling into contempt.

When I conſider the great erudition and experimental knowledge with which ſome of the faculty are diſtinguiſhed, I am convinced, that *even an able apothecary*, who has availed himſelf of all the modern diſcoveries and improvements, is greatly ſuperior to *Hippocrates, and the whole tribe of ancient phyſicians put together*, in the treatment of a diſeaſe; and, conſequently, *that the preſent practice, in the hands of a few, is greatly preferable to the*

practice of any preceding age; but had *Hippocrates* lived in this century, and known what an able apothecary may at this day know, we ſhould, long ere now, have had a theory and practice of Phyſic, *as ſimple and perfect, as he was ſimple and great.*

But when, on the other hand, I contemplate the encreaſing *commercial ſtate of phyſic*, which naturally diſcourages the lopping off any ſuperfluities which would be prejudicial to the *trade*, and checks the progreſs *to that ſimplicity which conſtitutes the eſſence of good practice, and ſtamps a juſt value on the faithful practiſer or performer*, and at the ſame time conſider the miſtakes ariſing from *contradictory theories*, and the injuries that proceed from *myſtery, prejudice, and faſhion in phyſic, I am perſuaded there never was an age in which the practice was worſe, in the hands of many* ———. Nothing can redeem the ſinking credit *of the moſt honourable and humane profeſſion under heaven*, but the abolition of the *degrading, inexpedient, and hurtful mode of ſatisfying the apothecaries*, the baniſhment of *commerce, myſtery, prejudice, and faſhion from the ſacred art*, and the introduction *of a more ſimplified theory and practice*. Such a reformation is devoutly wiſhed

for

for by every conſiderate, intelligent man, and by none more cordially than *the moſt learned, conſcientious, and diſintereſted part of the faculty*, many of whom have lamented to me *the preſent ſtate of the practice of phyſic in terms of deep regret*.

The foregoing ſtrictures, I take this opportunity to declare, do not proceed from any want of regard to the faculty, as they ſeem, from their unfortunate ſituation, in a manner compelled into the practice of which I complain; but they proceed from a ſincere regard to the profeſſion, among whom I have ſome valuable friends, *who, as men of honour, and in the line of their profeſſion*, are equally the objects of my imitation and eſteem. No man entertains a higher opinion than I do of the phyſician, or other practiſer, who with learning, and the knowledge of nature in one hand, and integrity and humanity in the other, devotes his days to the relieving the pains and ſufferings of the afflicted, he may be truly ſtiled the *friend of man*. There are indeed thoſe of another deſcription in every country, both regular and irregular; *but here I ſhall forbear to exhibit a picture, which a regard to the feelings of my readers, as well as my own,*

forbids me to draw. Suffice it to ſay, that phyſic *is an honourable and uſeful ſcience to the learned and diſintereſted; but a trade, a ſad trade to the ſelfiſh and ignorant.* There was a time when our leſs poliſhed forefathers meaſured the abilities of the phyſician and apothecary, by the length of the preſcription, and the number and ſtrength of the doſes; and ſtrange as it may ſeem, there are ſtill not a few who make this injudicious eſtimate. There was a time when almoſt every drug was cried up, as poſſeſſing ſome wonderful virtue; at this day, however, from the moſt accurate experiments and obſervation, the drugs of real worth in medicine are reduced to an inconſiderable number; and, it is now found, that the boaſted virtues of the reſt never exiſted any where, but in the imagination of the antiquated preſcribers; yet there are ſtill ſome of this ſort of medicine mongers, who continue to puniſh ſociety with their abſurd preſcriptions.

But in an age " more fertile in great events, than any of the preceding, diſtinguiſhed by important diſcoveries, and the completion of former events, diſtinguiſhed by the encouragement given to the arts and ſciences, and the

the ſucceſs with which they have been cultivated *." In an age, when great numbers of both ſexes, and of all profeſſions, are familiarizing thoſe ſtudies, which were formerly ſuppoſed to be acceſſible only to ſuch as had dedicated themſelves to literary and philoſophical purſuits; in ſuch an age, can it be doubted, that phyſic, like the other arts and ſciences, will, at laſt, *be freely inveſtigated, improved, and ſimplified?* and as a preliminary ſtep to improvement, can it be doubted, *that the wiſdom, propriety, and ſafety, of treating the apothecaries with a liberality becoming their profeſſion, will be diſcovered and adopted?* by which means a neceſſary body of men will be rendered moſt uſeful and reſpectable. In ſuch an age as this, can it be doubted, *that the plain, rational, almoſt ſelf-evident doctrine of the preſerving principle, elementary air,* as ſtated in the foregoing pages, will be *critically examined, underſtood, and applied*; and that the *Aqua Salubris* will, ere long, be prepared in every houſe, and its ſingular benefits generally realized?

Although I am perſuaded, that my recommendation of the *Aqua Salubris*, and my ſtrictures on the preſent ſtate of the prac-

* Baron Bulfield.

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tice of phyſic, will receive the approbation of ſome of the moſt reſpectable part of the faculty; yet I am, at the ſame time, ſenſible that they will create me many enemies, of which I have begun to have ſome experience. My endeavours to bring the *Aqua Salubris* into uſe, have already been attended with no ſmall injury to my practice; but regardleſs of conſequences, I ſhall think it my duty to proceed with unremitting diligence in the benevolent undertaking, which, from the beſt intentions, I have ventured to begin. *I ſhall, therefore, without dread, commit myſelf to the juſtice and magnanimity of the Sovereign, and to the wiſdom of the Legiſlature, of the moſt honourable nation on earth, which, I hope, will not ſuffer me to be undone by my liberality to the public.*

I cannot expreſs the pleaſure and ſatisfaction of mind I feel, in giving this communication of the *Aqua Salubris* to the world, as being the moſt honourable and eſſential ſervice I can ever expect, at my time of life, to have in my power to render to the human race in general, or my country in particular. So much am I aſſured of its great utility, that I do not ſcruple to hazard the opinion I would

wiſh to be formed of my integrity as a man, and my reputation as a phyſician, on the conviction of the moſt diſcerning and philoſophical man of this, or any other country, reſulting from a fair and an impartial trial: nor am I ambitious of any greater credit in the line of my profeſſion, than to be chiefly inſtrumental in bringing it into uſe, and making its virtues generally known.

Thus I have performed a duty, which a regard for the intereſts of mankind, and a love to my country, would permit me no longer to delay. What ſhare of approbation I ſhall receive from the preſent age, I do not pretend to conjecture; but I reſt aſſured, when remaining prejudices ſhall have yielded to further advances in ſcience and experimental knowledge, that I ſhall hold a place in the grateful remembrance of generations to come, in conſideration of being the phyſician who firſt communicated the extenſive virtues of the *Aqua Salubris*, and recommended it to general uſe, as a neceſſary of life, as the moſt rational means of attaining length of days with happineſs, and of preventing and alleviating the pains and ſufferings incident to mankind; as the phyſician who, greatly to the prejudice of his perſonal intereſt,

publiſhed an advice, which will remain unalterably valid in every climate, and through all ſucceeding ages, ſo long as the human frame ſhall conſiſt of the ſame materials, and while the laws of nature ſhall continue the ſame.

I COME now to point out a number of diſeaſes which commonly admit of a temporary relief from a judicious adminiſtration of medicine, but which, to the great mortification of the patient, too frequently recur. Happily, however, the return of theſe complaints may now be prevented by the uſe of the *Aqua Salubris*, as a neceſſary of life, in the manner I have directed; or their virulence may be greatly mitigated, ſo as to render them very tolerable.

Every intelligent perſon muſt be ſenſible, that it is much eaſier to prevent maladies than

to

to cure them. He muſt be ſenſible that conſtitution, health, and even character, in a great degree, depend on what he eats and drinks, and the manner in which he lives. He muſt alſo be convinced, that he, as well as others, from the viciſſitudes of the weather, from his employment, from his convivial pleaſures, and other cauſes, is daily liable to various complaints, particularly rheumatiſm, gout, gravel, ſtone, ſcurvy, debility, and other chronic diſorders, in his own right, and ſometimes by inheritance. Thoſe who reaſonably expect to enjoy the ſweets of health, will readily perceive the neceſſity of a wiſe regulation of the paſſions, of attention to diet, and of temperance in eating and drinking: they will ſee the neceſſity of exerciſe, expoſition to the weather, regularity of hours, and early riſing. But notwithſtanding the greateſt care that can be taken, we are ſtill expoſed to the diſorders already mentioned. Thoſe who are ſo faithful to themſelves, as to lay aſide their prejudices, will find the *Aqua Salubris*, combined as directed, the moſt agreeable, and at the ſame time the moſt effectual preſervative againſt theſe complaints, or it will, at leaſt, render life very comfortable under them.

But

But too much is not to be expected from it, when these complaints come on with great violence, or have been of long standing, more powerful medicines will, in the first instance, become necessary: the elementary principle, *Fixible Air*, valuable as it is on such occasions, must be considered as a preserving, restoring, convalescent remedy, rather than an active and powerful medicine. What numbers of every description who, like myself, have been afraid to go to bed, in dread of tedious and restless nights of agonizing pain, and who shall have the prudence to avail themselves of the wholesome, disinterested advice now given, will pass the remainder of their days in ease and tranquillity!

It has been observed to me, that as simple water seems to have been the only drink for man, in a state of nature, it ought, on that account, to be the only drink in a state of civilized society. Those who hold such an opinion, seem to forget, that a pure state of nature, if ever there were any such, must have existed at a time of which we have no records; for, by every account of the most barbarous nations yet discovered, they have afforded no inconsiderable testimonies of their being di-

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rected by art. I apprehend *art* to be the beſt *improvement of nature*; or, in other words, it is the exerciſe of the human intellect, in diſcovering the *beſt application of the various productions of nature to the uſe of man*. In an abſolute ſtate of nature, the human ſpecies muſt have employed their whole attention about their mere ſubſiſtence, feeding on acorns and nuts, and ſuch like wild productions, and drinking the waters of the brook; they muſt have covered themſelves with *fig-leaves* or ſkins, and ſheltered themſelves from the inclemency of the weather in caves and holes of the rock: they muſt have paſſed a dreary ſolitary exiſtence, in contemplation of Providence, to be the progenitors of ſubſequent generations, which, in proceſs of time, were to be ſubdued and civilized by *art*; but to ſhow that water was not intended as the ſole drink of mankind, at leaſt in a ſtate of ſociety, it needs only to be obſerved, that wine and ſtrong liquors were uſed in the very earlieſt of ages, of which we have the moſt diſtant accounts.

For my own part, I am diſpoſed to believe, that the Author of our being, who giveth liberally, and upbraideth not, did not intend to feed the human race like felons, on bread and water;

water; but having furniſhed us with animals and vegetables for our uſe, and to be raiſed and cultivated by our induſtry, hath alſo inſtructed us by art, to prepare wine, cyder, beer, and other fermented liquors, not only to enable us to ſuſtain the laborious toils of huſbandry, manufactures, and commerce, but alſo to render the life of man ſocial, comfortable, and agreeable. So far is water, valuable as it is, from being intended as the only drink, that I may ſafely affirm, that wine is equally natural with water; for the fermentive proceſs is nature's own work as much as vegetation, and that the juices of the grape, apples, and other fruits, may not be loſt for our uſe, the fermentive proceſs takes place of its own accord, without our intervention. We can indeed regulate, or accelerate, and reſtrain fermentation, but we can no more produce it, than we could cauſe a tree to vegetate.

RHEUMATISM.

I have already obſerved that the rheumatiſm, and other chronic diſeaſes, and probably many of the acute kind, are occaſioned by a deficiency of Fixible Air in the ſyſtem.

This

This elementary preſerving principle, being extremely volatile, readily makes its eſcape through the pores, even when they are ſo much obſtructed as to prevent the tranſpiration of groſſer matter, which ought alſo to tranſpire, and leaves the ſaline, oily, inflammatory, earthy, and aqueous particles to act upon each other, in proportion to their reſpective attracting, and repelling powers, which thereby form new and various combinations productive of theſe complaints * ; or, in other words, whatever obſtructs the perſpiration, whether changes of weather, expoſition to heats and colds, wet feet, damp ſituations, thin clothing, or unwholeſome indigeſtible food, when the fermentive proceſs in digeſtion goes on badly, and furniſhes but little Fixible Air, all theſe may be conſidered as the remote cauſes, and the various new morbid combinations formed in the ab-

* " We have no where, ſays an excellent philoſopher, " more ſtriking examples of the converſion of matter into " new forms, than in the bodies of animals: changes ef- " fected by a natural proceſs, which art has in vain at- " tempted to imitate or account for."

NEWMAN'S CHYMISTRY.

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ſence of the Fixible Air, may be called the proximate cauſes of theſe maladies.

There are two kinds of rheumatiſm, the acute and the chronic. The acute is uſually attended with fever and inflammation, and ſometimes with a ſwelling of the parts affected, and ſhould be treated like any other inflammatory fever. It generally attacks youth and the adult, who are what is called plethoric, or full of blood; but as this kind does not come under the claſs of the diſorders of which I am now to treat, I ſhall paſs to the chronic rheumatiſm, ſo called from its continuance.

This complaint commonly afflicts perſons ceaſing to be young, and the aged. The chronic rheumatiſm is rarely accompanied with fever, inflammation, or ſwelling. It is uſually ſtationary, and ſeizes upon a particular part of the body, frequently the large articulations or joints, the ſhoulders, hip-bone, back, loins, or knees. Sometimes it is almoſt univerſal, at other times it is erratic, and wanders from place to place, and on that occaſion it greatly reſembles the gout.

The following effectual remedies I have uſed myſelf to remove this complaint in the

firſt inſtance, with conſtant ſucceſs, and for a number of years have preſcribed with equal advantage to many others. In the firſt, I put myſelf upon a cooling diluting regimen for two or three days before I take any medicine, ſuch as weak mutton broth, milk porridge, or water gruel with a little wine; I then begin my medical courſe with cleaning firſt the paſſages with a gentle antimonial emetic. The ſecond night after taking the emetic, I take the following medicine:

℞ Camphor, five grains, mercurius dulcis, or ſweet mercury, three grains, conſerve of roſes, the bigneſs of half a nutmeg, formed into a bolus; after which I take the *following draught*, and occaſionally repeat it every third or fourth night after:

℞ Antimonial wine, twenty-five drops; Thebaic tincture, or laudanum, the ſame quantity; pure water, an ounce and a half.

The night following I take a bolus, with only two grains of ſweet mercury, but the other

other ingredients as before, and ſo continue taking it every night until my pains abate, or my mouth is a little affected. When that happens to be the caſe, I deſiſt, and take the following opening draught, half at bed-time, the other half in the morning early:

℞ Powder of rhubarb, twenty grains; ſal. pollychreſt. two drachms; tincture of rhubarb, three drachms; mint water, an ounce; pure water, an ounce and a half.

In a night or two after, I repeat the bolus, and ſometimes the antimonial draught with or without the laudanum, according as circumſtances require, and thus proceed in the ſame manner as before, until my pains are conſiderably abated; I then commence the uſe of the alkaline ſolution, ſaturated with *Fixible Air*, which I diſtinguiſh by the name of *Aqua Salubris Alkalina*, and is the ſame as the *Aqua Mephitica Alkalina*, ſo highly and *juſtly* recommended by Dr. Falconer, which I have already had occaſion to mention.

This valuable ſolution is prepared moſt conveniently in the following manner:—Put two ounces

ounces and a quarter of the ſalt of tartar * or wormwood into an open earthen veſſel, commonly called Queen's-ware, and add to it five wine quarts, or a little more, of diſtilled, or other pure and ſoft water, and ſtir it about for the firſt hour frequently, with a piece of clean wood, and let it ſtand to diſſolve for the ſpace of twenty-four or thirty hours, then pour off, clear and free from any reſiduum or depoſition of any indiſſolved matter that may remain, as much as will fill the middle glaſs of Dr. Nooth's apparatus; the alkaline liquor is then to be impregnated with Fixible Air for the ſpace of forty-eight hours, during that time; when the *Fixible Air* ceaſes to riſe in the lower glaſs of the apparatus, freſh materials muſt be put into that glaſs to renew the efferveſcence, which muſt be repeated four or five times, and then the *Aqua Salubris Alkalina*, or the *alkaline ſolution*, will be ſufficiently impregnated:

* For a very inveterate rheumatiſm of a long ſtanding, and when the circumſtances of the patient will admit, I have ſometimes increaſed the quantity of the alkaline ſalts, and directed two ounces and a half, and ſometimes three quarters, with the ſame quantity of water already mentioned; but when the uſe of the ſolution becomes neceſſary for a length of time, I apprehend the firſt preſcription

it is then to be put into half pint bottles, which are moſt convenient, and to be well corked and cemented with wax, and laid on their ſides in the cellar, or other cooler part of the houſe. Of this ſolution I drank about eight ounces, or half of a pint, every ſixth hour, in the morning, at noon, ſix in the evening, and bed-time, with a little Holland's geneva or brandy, and well ſweetened with honey, and ſometimes with milk added, for the firſt two or three days; then I proceed for a few days more with a half pint every eighth hour, andat laſt with one half pint evening and morning, until my pains are abated; in the mean time I uſe the Aqua Salubris in the manner preſcribed as my common daily drink. I had made trial of Mr. Bewley's method of taking the alkaline ſolution, but by repetition, it became diſagreeable to my ſtomach, which led me to the foregoing method, and which I have practiſed ever ſince. *Mr. Bewley* certainly had the merit of diſcovering, that al-

is ſufficiently ſtrong; alſo in a violent ſciatica, or where the ſituation would admit, I have directed cupping, and the ſame evening a bliſter to be applied, and, as ſoon as the bliſter was ſkinned over, the frequent application of Dr. Steers' Opodeldoc, with manifeſt ſucceſs.

kaline

kaline ſalts are capable of being *neutralized by Fixible Air*, and it appears that *Mr. Colburn*, of Bath, has the credit of aſcertaining the *ſolvent power of the alkaline ſolution* in calcareous caſes, or ſtone and gravel. *I believe I am the firſt*, at leaſt as far as I know, who has applied the alkaline ſolution to *the cure of the rheumatiſm*, for a number of years, with equal and invariable ſucceſs; the effectual remedies already mentioned, being firſt taken. The return of my rheumatiſm is effectually prevented by the uſe of the *Aqua Salubris*, until I either diſcontinue it, or am attacked with a ſevere cold, on which occaſions I feel a ſlight degree of my complaint; but theſe ſlight returns yield to a few doſes of the ſolution, and the uſe of the Aqua Salubris as my common drink. In this diſeaſe bleeding is generally very prejudicial, as alſo ſevere purgatives, which only ſerve to reduce the ſtrength of the patient, and to continue and rivet the complaint. Some years ago I knew a Lady, a little upwards of fifty years of age, who had been confined to her bed by the rheumatiſm, and alſo complained of an obtuſe dull pain in her ſide, which, however, did not affect her breathing. She had unfortunately loſt about

ten ounces of blood, by the advice of a phyſician, and was taken ſo ill ſoon after, that her friends deſpaired of her life, and another phyſician was immediately called in. When he arrived, he found the loſs of blood had occaſioned a ſevere intermittent fever, and the pain in her ſide ſtill remained as bad as ever. He directed a bliſter to be immediately applied to the ſide affected, by which her pain was ſoon relieved; but it required ſome time, with bark, generous wine, and nutritious diet, to ſubdue an obſtinate tertian. This miſtake was a ſtrong example of medical prejudice and faſhion, or what the *excellent Dr. Zimmerman* very juſtly calls *routine, and falſe experience in phyſic*. No two characters have a greater reſemblance to each other, than the *able General* and the *experienced Phyſician*; they both act with a conſtant conformity to the occurrence of various circumſtances which may ariſe; therefore I may ſafely affirm, there never was, in any age, *an able man, and faithful to his truſt, either a faſhionable General, or a faſhionable Phyſician.*

GOUT.

Although I confeſs I do not know an inſtance where the uſe of the *Aqua Salubris* has prevented the return of this complaint, yet I can, with as great certainty affirm, that it has contributed greatly to mitigate the *paroxiſms*, and to render them leſs frequent, when uſed as a common drink. This diſorder, like the former, is owing *to a deficiency of the Fixible Air* in the ſyſtem, and the morbific matter which is accumulated, may be in a great degree *reſolved* by the alkaline ſolution, and the *accumulation greatly prevented*. During the fit, little or no aſſiſtance can be effectually given; all that can be with ſafety done is, to adminiſter gentle, warm, laxative medicines, to carry off the offending matter, and frictions to the parts affected, and to endeavour to keep the diſeaſe at the extremities, the greateſt diſtance from the more vital parts. Should it aſcend to the ſtomach or head, in ſuch a caſe, wine, cordials, or opiates, muſt be employed, in ſufficient force, to remove it. As ſoon as the fit, which conſiſts of a number of paroxiſms, is over, the patient, if he is pru-

dent, and has learned to profit by his paſt ſad experience, muſt immediately, with reſolution, apply himſelf to the beſt means of leſſening the violence of the ſucceeding fit. The beſt means of affecting ſo *deſirable a purpoſe*, is to avail himſelf of the *alkaline ſolution*, guarded with good Madeira, cherry, or good old ſpirits, and ſweetened with honey, if it agrees with the ſtomach, at leaſt three times a day, or twenty-four hours, and for ſome conſiderable time after to take it evening and morning in the ſame manner, and at the ſame time making the *Aqua Salubris* his uſual drink, and obſerving a temperate, eaſily digeſted and nutritious regimen. Were ſuch a conduct ſteadily attended to, immediatly after the firſt attack, or firſt approaches, there ſeems little room to doubt, that the return of the gout might as eaſily be prevented as the return of the rheumatiſm.

G R A V E L.

When ſand or ſmall ſtones are lodged in the kidnies, or diſcharged by urine, the patient is ſaid to have the *Gravel*; but when a ſtone or ſtones fall into the bladder, and accumulates by

by means of mucous and ſabulous matter, to a ſize that will not admit of being paſſed by urine, it is then called the *Stone*.

In a ſevere fit of the gravel, if the patient happens to be young and plethoric, then letting of blood may be neceſſary, with fomentations, or warm bath up to the middle: after which, the alkaline ſolution may be taken as directed for the rheumatiſm, at leaſt three times in twenty-four hours, for the ſpace of two or three days, or more, until the ſymptoms abate, and the gravel diſappears, and at the ſame time the *Aqua Salubris*, as already preſcribed, ſhould be the uſual and daily drink, with now and then a laxative medicine. As the aged are not, in general, liable to inflammation in this diſeaſe, bleeding is not only *rarely neceſſary*, but uſually *hurtful* to them; therefore, when the fit is ſevere, the ſame remedies recommended for the rheumatiſm, in the firſt inſtance, may be uſed with advantage. If the patient is very young, the ſolution muſt be reduced to two-thirds, or one half the quantity given to adults, in proportion to his age, and with a due regard to other circumſtances.

STONE.

When the ſtone falls into the bladder, and accumulates to a ſize, which prevents its paſſing by urine, the alkaline ſolution * muſt be uſed, as already preſcribed in the gravel, or a warm injection, conſiſting of two third parts of the ſolution, and one-third part of it may be adminiſtered with common water. This operation is now rendered eaſy, by means of the flexible catheter, a modern valuable invention; the ſolution, by injection, poſſeſſes all its ſolvent powers entire, which are certainly diminiſhed, when taken by the mouth in its tranſition to the bladder. There ſeems no danger from irritability in the uſe of the injection, which is not near ſo irritable as the urine of a healthy perſon; and there can be no danger from the diſtention, if care is taken not to inject the ſolution too ſuddenly. Whichever is preferred, *the uſe of the ſolution* ſhould be continued until the pains are

* The ſolution may be increaſed in its ſolvent power, ſhould the nature of the caſe and circumſtances of the patient require it. See the preceding note.

removed,

removed, and the ſtone diminiſhed, or perhaps diſſolved; *then the Aqua Salubris*, as preſcribed, ſweetened with honey or capillaire, will be the beſt uſual drink, and, in all probability, prevent the future accumulation of the ſtone *. It is fortunate for thoſe afflicted with this diſorder, when they like honey, for they may, with great advantage, indulge the uſe of it. The food in general ſhould be bland, and moderately nutritious; and when the *Aqua Salubris* may prove too irritating, which it ſometimes does in caſes of the ſtone,

* "That calcareous earths are made ſoluble in water, by being united with more than their proportion of Fixible Air, has been pointed out by a ſeries of well-conducted and accurate experiments of an eminent modern philoſopher, the Hon. Mr. Cavendiſh. This diſcovery ſuggeſted the idea of the ſolubility of the human calculus while yet in the bladder, by the regular and continued uſe of Fixible Air. Dr. Saunders and Dr. Percival firſt inculcated this opinion; and the firſt of theſe Gentlemen pointed out, that the diminution of calculi, or ſmall ſtones, being put into fermenting mixtures, as obſerved by Dr. Hales, was effected by the Fixible Air liberated in theſe mixtures. The diminution likewiſe of ſome calculi, by being immerſed, and macerated in water impregnated with Fixible Air, has been proved by the experiments of Doctors Saunders, Percival, and Falconer."

DOBSON'S COMMENTARIES.

muci-

mucilaginous liquors, ſuch as lintſeed tea, barley-water, and ſuch like, may be impregnated with Fixible Air, and uſed with much benefit to the patient.

BLOODY URINE.

Perſons liable to the foregoing diſorders, are alſo ſubject to paſs bloody urine. It is occaſioned by the acrimonious matter which conſtitutes the rheumatiſm and gout, or ſmall gravel and ſtones eroding the coats of the ureters: the patient ſhould drink half a pint of the *Aqua Salubris*, ſweetened well with honey, to which ſhould be added half an ounce of the ſyrup of poppies, and ſix drops of the ſpirit of turpentine, three times in the twenty-four hours, for two or three days; and while he continues the *Aqua Salubris* as his uſual drink, in the manner already recommended, he may reſt aſſured it will not return.

SCURVY.

There is no diſeaſe, except the plague or leproſy, with which the human body is afflicted, in which there is a greater deficiency of the

Fixible

Fixible Air than in the Scurvy, eſpecially that ſpecies of it contracted on long voyages, called *the Sea Scurvy*. Conſtantly living on ſalted meats, muſty bread, and bad water, for a length of time, frequently produces the higheſt putrid and malignant ſymptoms. The fibres loſe their elaſticity and tenacity, to ſuch a degree, that it is attended ſometimes with danger that the patient can be moved: but even in this deplorable ſituation, the *Fixible Air* affords the patient almoſt inſtantaneous relief; the beſt remedy is the alkaline ſolution, taken in the ſame manner as preſcribed for the rheumatiſm. When the *alkaline ſolution* cannot be prepared for want of an apparatus, it may be uſed after the manner recommended by Dr. Hulm; " take of pure ſalt of tartar, one ounce troy weight, diſſolve it in ſixteen ounces of common water, and call it the *alkaline mixture*; alſo take of weak ſpirit of vitriol, two ounces (in meaſure) of common water fourteen ounces, to be called the *acid mixture*. Let the patient take half an ounce (in meaſure) of the alkaline mixture, in three ounces of common water, four times a day, and immediately afterwards let him drink half an ounce of the *acid mixture*, in the ſame quantity

tity of water, and continue theſe medicines till the ſcorbutic ſymptoms diſappear, and the patient's health be reſtored. If occaſion ſhould require, the doſe may be increaſed to double the quantity." The *Aqua Salubris* ſhould, at the ſame time, conſtitute the daily drink of the patient, a continuance in which will effectually ſecure him from a return of the diſeaſe.

I have had great ſatisfaction in finding the efficacy of the *Aqua Salubris* in ſcorbutic complaints, confirmed by a variety of trials during ſome long ſea voyages. About five years ago, Capt. Portlock, of the King George, and Capt. Dixon, of the Queen Charlotte, ſailed on a voyage to the South Seas, and the Northward coaſt of America; I directed a quantity of the *Aqua Salubris* to be ſent on board each ſhip, in order to put it to the moſt ſevere teſt. Upon their arrival from their voyage round the world, *they both* aſſured me, *it had in every ſcorbutic caſe the beſt effects.* Capt. Dixon was himſelf brought to the brink of death with a ſevere ſcurvy, accompanied with a malignant fever, and attributes the favourable eſcape he made to the great antiſceptic power of the *Aqua Salubris*; and immediately, upon his

return

return to London, had recourſe to the uſe of it again. I alſo ſent ſome to a friend on board of an Eaſt India ſhip, on a voyage to China, where it had the ſame immediate happy effects in ſome very dangerous ſcorbutic caſes. It is unfortunate for the ſeamen, who are neceſſarily expoſed to the ravages of this fatal diſorder, that no good method has yet been fallen upon to impregnate a large quantity of water at once, as the glaſs apparatus, which certainly prepares it moſt perfectly, is too frangible for uſe at ſea. The difficulty lies in giving the Fixible Air a proper direction from one veſſel to another, and making the pipe of communication between them air tight, otherwiſe the Fixible Air makes its eſcape, and the water is not ſufficiently impregnated. Here Dr. Prieſtley's invention, though very meritorious, as leading to the improvement of the glaſs apparatus, yet requires too much addreſs to be very uſeful. I have heard of ſeveral other methods, but none of them, I believe, have given ſatisfaction. The following method has been ſuggeſted to me by a friend of mine, but I do not know that it has been tried: Let two caſks be made, one to contain thirty, and the

other

other about eight gallons, the ſmaller veſſel to be contracted at the head, as much as conveniently can be done, ſo as to preſerve ſtrength. Let apertures, capable of being ſtopt air tight, be made in the head of each caſk, for filling water into the larger, and putting the materials for liberating the Fixible Air in the ſmaller caſk; let the veſſels communicate with a leathern pipe, one end of which to be inſerted, air tight, into the head of the ſmaller veſſel, and the other end into the ſide of the larger caſk, about four inches from the bottom. The large caſk to be filled about three parts full of the beſt pure ſoft water that can be got, or the water commonly uſed, then put four gallons of water into the ſmaller caſk, and add two pounds (averdupoiſe) of the ſpirit of vitriol, and the ſame quantity of marble duſt, and afterwards ſecure the apertures in each caſk with ſtoppers or plugs, air tight. In half an hour, or an hour at moſt afterwards, let the large caſk be well agitated, and repeatedly, and the ſmaller one muſt be occaſionally ſhaken, but gently, leſt the materials contained within ſhould be driven into the pipe; and every three or four hours, let ſome of the freſh materials be put

into

into the ſmaller caſk, about one quarter part of what was uſed at firſt, until it is ſufficiently acidulated, which may be known by drawing a little off from a wooden cock in the large caſk. A braſs cock muſt not be uſed, as the Fixible Air would corrode the braſs, and injure the water. As ſoon as the water is ſufficiently impregnated, it ſhould be ſecured in large ſtone bottles, well corked and cemented with pitch or turpentine, prepared with a little tallow for the purpoſe; and when a bottle is opened, it ſhould be immediately uſed, as the impregnated water ſoon loſes its virtue when expoſed to the air. It is to be hoped, that ſome more commodious and perfect method of preparing the *Aqua Salubris*, eſpecially for the uſe of ſhips on long voyages. It is but reaſonable ſome trouble ſhould be taken to preſerve the health and lives of our ſeamen, on whoſe *valour* and *laborious ſervices this great nation* depends for her *ſecurity*, and for her *wealth*.

Hypochondriac and Hyſteric Affections.

Theſe diſorders in men and women are very ſimilar, as far as the difference of the ſex will admit

admit. Perſons of relaxed habits and defective digeſtion, which ever go hand in hand, are in every climate ſubject to them. They are generally, in this country, called *nervous* complaints. The word *nervous* is here totally miſapplied, it originally and emphatically implies ſtrength; but by an unaccountable miſapplication of terms, it is now uſed to denote weakneſs, or, in other words, that the ſyſtem of the nerves is affected. Admitting the error, in order to be underſtood, I muſt in the firſt place obſerve, that theſe complaints require but little medicine, and only ſuch as tend to ſtrengthen the fibres and the digeſtive powers. My intelligent readers ſuffering under theſe complaints, and who reaſonably expect to enjoy health and ſtrength in the future part of their lives, muſt put on reſolution, and lay aſide their former prejudices: they muſt begin with a ſubſtantial breakfaſt; almoſt all the nervous perſons of both ſexes ſhould eat a Sandwich in the morning, eſpecially if they cannot do without tea. They ſhould likewiſe eat a ſubſtantial dinner, avoiding things that are windy, and take little or no ſupper, ſuch as a cruſt of bread and a glaſs of wine, or ſuch like; and the *Aqua Salubris*, already preſcribed, ſhould

be

be their common drink. On the other hand, if they take a thin ſlice of bread and butter, and a few diſhes of diſvigorating tea, by the hour of dinner they are replete with wind, upon which they throw a great combination of diſcordant matters, and the ſtomach, aſtoniſhed at the unreaſonable taſk, is neither able nor willing to perform it; but there are others who are ſubject to the ſame complaints from different cauſes. Few indeed in this, or any other country, comparatively ſpeaking, have it in their power to be guilty of luxury; and chronic diſorders may ariſe from low living as well as high. The exceſſive uſe of tea among the middling and lower claſſes, eſpecially ſince the reduction of the price, confinement, ſedentary and hurtful employments, have rendered theſe diſorders ſo general, that they are no longer confined to the indolent and rich. As all theſe deſcriptions of perſons, both high and low, are much afflicted with flatulences, the conſtant effect of indigeſtion, I ſhall juſt obſerve, that the *Aqua Salubris*, as preſcribed, is found, in common caſes, to be the beſt expeller of wind *, (a great part of

 which

* Dr. Dobſon preſcribed the effervescent draught three times a day, to a patient troubled with flatulence for a length

which is atmoſpherical air), and is much more ſafe than ardent ſpirits alone, which are too often employed upon thoſe occaſions: and for this obvious reaſon, the *Aqua Salubris* infuſed with a little ſpirits, being taken cold into the ſtomach, and being at the ſame time very volatile, and ſpecifically heavier than the expanded air it meets with, neceſſarily expels it, and ſuddenly pervading the ſyſtem, by its ſtimulus it accelerates the circulation, and gives vivacity to the ſinking ſpirits of the patient, before oppreſſed with expanded air; but there are caſes when the inflations are very great, in which the Fixible Air in the *Aqua Salubris* would be prejudicial. Other remedies, ſuch as opium, ether, common ſpirits, infuſions of ginger, or of juniper berries, will be more proper, taken with judgment. Such as are troubled with violent nervous headachs, ſhould not meddle with the *Aqua Salubris*, until they are gone off; afterwards it will be of uſe.

length of time, with manifeſt advantage; and alſo for the loſs of appetite, with the ſame ſucceſs.

See his Commentaries, page 105—108.

In the Aqua Salubris the Fixible Air is in a ſtate of reſt, which renders it ſtill more ſafe and uſeful to flatulent patients.

Thus

Thus I have ſtated, from my own experience, the ſalutary effects of the *Aqua Salubris*, uſed as a neceſſary of life, in preventing the return, or greatly mitigating the violence of a number of chronic diſeaſes, which, if neglected, ſadly imbitter our paſſage through life, and lay the foundation of a miſerable and decrepit old age. *Fixible Air*, conſidered as a medicine *only*, has been applied with remarkable ſucceſs in a great variety of caſes. Dr. Dobſon, as appears by his excellent Commentaries, found its ſalutary effects in putrid fevers, ulcerated ſore throats, meazles, ſmall pox, gangreens, cancerous ulcers, flatulences, and ſome diſeaſes of the ſtomach. Dr. Hulm and Dr. Withering obſerved its efficacy in pulmonary conſumptions; and I have ſeen whey impregnated with Fixible Air, and well ſweetened with honey, produce good effects in that complaint, but it is apt to irritate the cough, unleſs a little ſyrup of poppies is added to take off the irritation.

Of the Uſe of the AQUA SALUBRIS *in hot Countries.*

As the health of northern countries is owing to the condenſation of *Fixible Air*, ſo the

ſickneſs and mortality in ſouthern climates are owing to the expanſion of the ſame elementary principle, and its being abſorbed by the moiſture of the atmoſphere. Relaxation is the conſequence of great heat and moiſture, and exceſſive bilious ſecretions are the conſequence of relaxation; for this reaſon, almoſt all the tropical diſeaſes may be ſaid to proceed from a bilious putreſcence. The moſt deſtructive diſeaſes of theſe countries are the remittent putrid fever, the dyſentery and liver complaint: in cold latitudes, the lungs are ſooner affected than the liver; but in hot climates, the exceſſive ſecretion of bile expoſes the liver to ſuffer from obſtruction, inflammation, and ſuppuration. The *Aqua Salubris*, from its ſingular power of reſiſting putrefaction, and reſtraining the ſecretion of the bile and its febrifugal and convaleſcent qualities, will be an ineſtimable acquiſition to theſe unhealthy countries. It may be uſed to the greateſt advantage as a common beverage, combined with Madeira or red port, which laſt is too ſtrong and heating to be drank alone in theſe countries.

I have heard with equal aſtoniſhment and concern, of the great quantities of mercury

that

that are preſcribed in this diſorder. A friend of mine, lately from the Weſt Indies, aſſured me, he had known one drachm of calomel given in one week to a patient, which is at the rate of more than eight grains a day. Alas, to what an alarming pitch does faſhion carry the practice of phyſic! Mr. Clark, who has favoured the world with á very ſenſible hiſtory of the diſeaſes of India, ſays, "There can be no doubt, that the ex-"ceſs of mercury is greatly exaggerated. It "is ſo faſhionable a remedy, that it is pre-"ſcribed in ſlight affections of the liver, "which, in all probability, might have "yielded to one bleeding or two, the repeti-"tion of gentle phyſic, or the application of "a bliſter."

There can be no doubt, however, that before the matter is formed, a due uſe of mercury may be very expedient, as is found in this country on ſimilar occaſions.

For the benefit of the Colonies, where I have many much reſpected friends, I will propoſe a method of treatment, which I have known to ſucceed in obſtinate and dangerous caſes. If the complaint is original, and not the conſequence of ſome former diſeaſe, let the

ſide be cupped in three different places at leaſt, upon the firſt indication of the diſorder. A few hours after let a bliſter be applied to the parts that have been cupped, from which there will iſſue a copious quantity of matter for perhaps forty-eight hours. The ſame evening, the following medicine muſt be adminiſtered: Argent. viv. or quickſilver, three grains; Rosin of Guaiacum and camphor, three grains; and Caſtile ſoap, four grains, with a ſufficient quantity of ſyrup, and form two pills, drinking after it a cup of wine whey. Next morning, let the patient take a pint of the alkaline ſolution already mentioned, which may have the cold air taken off, by dipping the bottle in warm water, adding to it a little brandy, and ſweeten it well with honey, of which alſo the patient may eat freely. Next night he muſt repeat the pills, with only two grains of mercury; and the alkaline draught the following morning, and ſo continue theſe medicines until his ſymptoms are abated, or until his mouth is affected; in that caſe it will be proper to deſiſt: give a gentle opening draught, and proceed as before, until the patient is relieved; if neceſſary, an opiate muſt intervene, to prevent the mercury paſſing downwards; but

ſhould

ſhould the diſeaſe be the conſequence of a fever or flux, the following medicine may be taken, which has been ſucceſsful in ſome dangerous caſes of the liver:

℞ *Solvent mineral* from Apothecary's-hall, *ſix grains*; *ſpirit of ſal. ammoniac, thirty drops*, being exceedingly well triturated in a glaſs mortar, to which add thirty drops of the ſweet ſpirits of nitre, and thirty ounces of pure water, and make a mixture, of which the patient muſt take half an ounce, or one table ſpoonful evening and morning, taking between them three or four effervescent draughts, viz. ſalt of tartar, and one ſpoonful and a half of lemon or lime juice; or it may be taken to rather better advantage, as recommended under *the Scurvy*: theſe remedies to be perſiſted in until the patient is relieved—no acid to be taken while under this courſe; the diet ſhould be very light and diluting, rice or water-gruel, with ſome generous wine in it: this treatment in a putrid caſe, is certainly preferable *to a ſalivation*. As ſoon as he has laid the mineral ſolvent aſide *, he muſt continue the

* This medicine was ſuggeſted by the ingenious Dr. De Vallingine.

Aqua Salubris as preſcribed, for his daily convaleſcent drink.

In the remitting putrid fever, it is abſolutely neceſſary the firſt paſſages ſhould be cleared with an emetic.

℞ diſſolve an ounce of manna in a pint of warm water, and ſtrain it, add two grains of tartar emetic, and give one quarter part of the whole every half hour till it operates. As ſoon as the patient is able, he muſt take the bark in as large doſes as his ſtomach will bear. The bark is moſt powerful in powder; but if the ſtomach will not retain it, recourſe muſt be had to the decoction; he muſt drink the *Aqua Salubris* as his conſtant drink, with red port or Madeira plentifully, which is more antiſceptic than the wine alone: where that is wanting, ſangris of Madeira ſhould be his conſtant drink. The bark, where there are marks of putridity, ſhould be given, without regard to the remiſſions or exacerbations of the fever. The time, on this occaſion, is too precious to be loſt in uſeleſs expectation.

In the Dyſentery, an emetic muſt alſo be preſcribed, after which the following remedy muſt be taken, from which I have ſeen almoſt

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invariably the beſt effects. ℞ Caſtor oil, freſhly expreſſed, half an ounce, mixed with the yolk of an egg or honey, or gum arabic, in two ounces of ſimple cinnamon water, and half an ounce of the ſyrup of poppies, to be taken at night going to bed, and to be repeated with or without the opiate, according to circumſtances, until the patient is relieved. Should ſymptoms of putreſcency encreaſe, recourſe muſt be had to the bark with wine; glyſters of the decoction of bark with wine alſo. During the different ſtages of the complaint, the *Aqua Salubris*, as preſcribed, ought to be his common beverage, and ſhould be perſiſted in, at leaſt until he is perfectly recovered. I muſt add, on this occaſion, that bleeding is fatal in general in the dyſentery of the hot climates, and frequently hurtful in this country.

Situations where the AQUA SALUBRIS *is moſt neceſſary and uſeful.*

1ſt. Hoſpitals, where the putrid effluvium from the breath of their ſickly inhabitants, is the ſource of a malignant fever peculiar to them.

2d. Jails

2d. Jails and priſons, where the evil is greatly encreaſed by the cloſs confinement of wretched criminals, ſometimes productive of a jail fever, nearly as malignant as the plague. Had that unaxempled pattern of humanity, *the excellent Mr. Howard,* been acquainted with the virtues of the *Aqua Salubris*, while on his benevolent pilgrimage, he might, by his humane ſolicitations, been inſtrumental of ſpreading a greater degree of chearfulneſs through the manſion of deſpair.

3d. Colleges and ſeminaries of learning will find great advantage from the artificial mineral water, not only in promoting health, and inducing temperance, but as moſt friendly to genius, and the exerciſe of the intellectual powers.

4th. Watering-places. It would be greatly for the health of invalids, as well as thoſe who go for amuſement, to add the benefit of the *Aqua Salubris* to that of the ſea bathing.

5th. Manufactories. The people confined to ſedentary employments, many of them hurtful, will receive great benefit from the uſe of the artificial mineral water, and moreover, it certainly will tend to make them more inventive.

To conclude, having with unremitted aſſiduity, for a number of years, been enabled to aſcertain the virtues of the *Aqua Salubris*, and having the moſt ſatisfactory evidences of its extenſive uſefulneſs in every climate; and moreover, having determined to make it one of the principal objects of the reſidue of my days, to inculcate the uſe of this valuable acquiſition, I have thought it a duty I owe to ſociety, to cauſe it to be prepared under my inſpection, and to be placed in the hands of reſpectable perſons, to be diſpoſed of, for the accommodation of ſuch as may find it either inconvenient or impracticable to prepare it for themſelves. As it had become abſolutely neceſſary, that ſome *one* of the profeſſion ſhould develop the cauſes of the preſent unſucceſsful practice of phyſic, I have thought it incumbent on me to undertake the neceſſary, yet hazardous taſk. How great ſoever the ſacrifice now made to the public good may be, I do not grudge it, for, in making ſuch a ſacrifice, I have done no more, as an honeſt man, than my duty; and muſt indeed have been unhappy, had any intereſted conſiderations tempted me to have left it undone.

Should,

Should, however, the advice given in the foregoing pages, be in any tolerable degree adopted, I ſhall have at leaſt the pleaſing conſolation to reflect, *that I have contributed as much as any phyſician ever did in any age, to the health and happineſs of mankind.*

☞ A Plate of the Apparatus was intended to have been prefixed to this Publication, but it has ſince been repreſented to me, that it would be unneceſſary, on account of the frequent improvements that are making, and expected to be made upon it.

FINIS.

THE Aqua Salubris is, under my appointment, diſpoſed of by Mrs. E. Newbery, the corner of St. Paul's Church-yard; Meſſrs. Shepperſon and Reynolds, No. 137, Oxford-ſtreet; Mr. G. Burnett, No. 184, Strand; and Mr. W. Richardſon, under the Royal Exchange.